SAN FRANCISCO DISTRICT

US Army Corps of Engineers

PUBLIC NOTICE

NUMBER: 22731S DATE: April 10, 1998
RESPONSE REQUIRED BY: May 11, 1998

Regulatory Branch
333 Market Street
San Francisco, CA 94105-2197

PERMIT MANAGER: Rob Lawrence PHONE: 415-977-8447;
E-mail rlawrence@smtp.spd.usace.army.mil

1. **INTRODUCTION:** Mr. Carl Hanson from San Francisco Drydock, Inc. (through his agent Dr. Kurt Kline of Advanced Biological Testing, Inc., 5685 Redwood Drive, Rohnert Park, California (707) 588-2880) has applied for a Department of the Army permit to dredge Berths 1 and 2 at San Francisco Drydock, City and County of San Francisco, California. The proposed dredge work would maintain safe navigational and working depths within the shipyard. Drydock 1 has been in operation since 1943; Drydock 2 has been in operation since 1969. The most recent dredging at Drydock 2 was carried out in 1995. At that time, the area off the north end of Drydock 2 had elevated levels of polycyclic aromatic hydrocarbons and was not dredged. This application is being processed pursuant to the provisions of Section 404 of the Clean Water Act (33 U.S.C. 1344) and Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. 403).

2. **PROJECT DESCRIPTION:** As shown in the attached drawings, the applicant plans to remove approximately 70,000 cubic yards (cys) of dredge material from Drydock 1 and approximately 196,000 cys from Drydock 2. Dredging in Drydock 1 berthing area would be to a design depth of -49 feet Mean Lower Low Water (MLLW), plus a 2-foot allowance for overdredging; in Drydock 2 berthing area to a design depth of -62.5 MLLW, plus a 2-foot allowance for overdredging. Dredging would be performed with a clamshell dredge, dump scows and a tugboat. The dredged material would be transported by barge to the Alcatraz Disposal Site (SF-11). Summarized chemical and bioassay analyses of the sediments to be dredged are included with this Public Notice.

3. **STATE APPROVALS:** Under Section 401 of the Clean Water Act (33 U.S.C. Section 1341), an applicant for a Corps permit must obtain a State water quality certification or waiver before a Corps permit may be issued. The applicant has provided the Corps with evidence that he has submitted a valid request for State water quality certification to the San Francisco Bay Regional Water Quality Board. No Corps permit will be granted until the applicant obtains the required certification or waiver. A waiver shall be explicit, or it will be deemed to have occurred if the State fails or refuses to act on a valid request for certification within 60 days after the receipt of a valid request, unless the District Engineer determines a shorter or longer period is reasonable for the State to act.

Those parties concerned with any water quality issues that may be associated with this project should write to the Executive Officer, California Regional Water Quality Control Board, San Francisco Bay Region, 2101 Webster Street, Suite 500, Oakland, California 94612, by the close of the comment period of this public notice.

The project is in the jurisdictional purview of the San Francisco Bay Conservation and Development Commission (BCDC). The applicant will be required to obtain a permit from BCDC after the RWQCB has made a determination of water quality certification for this project.

4. **PRELIMINARY ENVIRONMENTAL ASSESSMENT:** The U.S. Army Corps of

Engineers (USACE) has assessed the environmental impacts of the proposed project in accordance with the requirements of the National Environmental Policy Act of 1969 (Public Law 91-190), and pursuant to Council on Environmental Quality's Regulations 40 CFR 1500-1508, and USACE Regulations 33 CFR 230 and 325. Unless otherwise stated, this Preliminary Environmental Assessment describes only the impacts (direct, indirect, and cumulative) resulting from activities within the jurisdiction of the Corps of Engineers.

The Preliminary Environmental Assessment resulted in the following findings:

a. IMPACTS ON THE AQUATIC ECOSYSTEM

(1) PHYSICAL/CHEMICAL CHARACTERISTICS AND ANTICIPATED CHANGES

Substrate - The drydock areas to be dredged cover an area of approximately 2.1 acres for Drydock 1 and approximately 7.3 acres for Drydock 2. Existing depths range from -37 to -40 feet MLLW under Drydock 1 and from -47 to -54 feet MLLW under Drydock 2. Sediments are comprised of >95% silt and clay which is typical of sediments in the general area. Proposed dredging work would remove a total of approximately 266,000 cubic yards of sediment, lowering substrate elevations to a total depth of -51 feet MLLW (including a 2-foot overdepth allowance) under Drydock 1 and to a total depth of -64.5 feet MLLW (including a 2-foot overdepth allowance) under Drydock 2. Since the natural processes of sediment loss, transport and accretion may cause similar disturbances to the substrate, the associated effects of dredging operations on substrate conditions would be adverse but short-term and minor to moderate in magnitude. Dredged material would be disposed at the Alcatraz Disposal Site and could result in altering existing substrate with a layer of newly deposited sediments. SF-11 is primarily a dispersive disposal site, with less than 40% of the deposited sediments retained. The associated effects of disposal operations on substrate conditions would be averse but short-term and minor in magnitude.

Erosion/Sedimentation Rate - Dredging work would result in localized sloughing of sediment along the side slopes and portions of the drydock basins, increasing the rate of erosion and sedimentation until a stable angle of repose was attained. Considering the excavation depth and volume of dredged material to be removed, the associated effects of dredging operations on erosion and sedimentation rates would be adverse but short-term and minor to moderate in magnitude.

Water Quality - Dredging and disposal operations may affect water quality variables such as dissolved oxygen (DO), pH, salinity, total suspended solids (TSS), and turbidity. Turbidity near the dredging and disposal sites would increase because of additional TSS in the water column. DO levels in the water column would decrease during disposal events due to increased turbidity. Since ambient water quality conditions recur shortly after each dredging event, the associated effects of dredging and disposal operations on these water quality variables would be adverse but short-term and minor in magnitude.

The suitability of the proposed dredge material for aquatic disposal in San Francisco Bay was evaluated by an interagency group consisting of representatives from the Corps of Engineers, U.S. Environmental Protection Agency, San Francisco Regional Water Quality Control Board, San Francisco Bay Conservation and Development Commission, and the State Lands Commission. The group considered chemical and biological test results submitted by the applicant under Public Notice 93-2 protocols. The group's consensus opinion is that most of the proposed dredge material is suitable for aquatic disposal at SF-11. One area at the northern end of Drydock 2 (Area 6) contains elevated levels of polycyclic aromatic hydrocarbons (PAHs) as it did in 1995. This area would not be dredged.

Chemical and physical analyses and biological testings completed in June 1997 by Advanced Biological Testing, Inc. (ABT, Inc.) and are summarized in Attachment A, Tables 2, 4 and 7. These test results were reviewed in 1997. All sediments except for Area 6 were approved by the

members of the interagency group.

Bulk concentrations of trace metals and organic contaminants from sediment samples taken during the 1997 analysis were consistent with the levels found in San Francisco Bay, except Area 6. Results of the bioassay testing indicated that sediment samples did not exceed Limiting Permissible Concentrations based on suspended phase testing and there was no appreciable toxicity for benthic (bottom dwelling) organisms.

Based on the data in the May 1997 sampling, the interagency group concluded that the unconfined aquatic disposal of the dredged material from San Francisco Drydock Berths 1 and 2 will not pose a significant risk of adverse ecological impacts.

(2) BIOLOGICAL CHARACTERISTICS AND ANTICIPATED CHANGES

Endangered Species - Federally-listed endangered adult winter-run chinook salmon (Oncorhynchus tschwytscha) migrate through San Francisco Bay, as well as Suisun Bay and Honker Bay, to spawning areas in the upper Sacramento River during the late fall and early winter. Juveniles travel downstream through San Francisco Bay to the Pacific Ocean in the late fall as well. The movements of adult and juvenile salmon through the Bay system are thought to be rapid during these migrations. Since impacts to the water column during disposal events would be short-term, localized and minor in magnitude, no potentially adverse effects to winter-run chinook salmon that may be near the disposal site are anticipated.

Habitat for Fish, Other Aquatic Organisms, and Wildlife - Suspended particulate phase bioassays completed by ABT, Inc. in May 1997 are summarized in Attachment A, Table 4. The test results for LC 50 values ranged between 47% and > (greater than) 100% (for Area 6) for the nine composite samples. The IC50 values ranged from 61% to >100%. The LC50 value is that concentration of dredged material in the suspended particulate phase that produced 50% mortality in test organisms, Mytilus edulis (Bay mussel). The IC50 value is that concentration of dredged material in the suspended water column that produces 50% abnormality in developing larvae of Mytilus edulis.

ABT, Inc. calculated the projected concentration of dredged material in the suspended phase (Csp) at the Alcatraz disposal site, after allowing for initial mixing, to vary between 0.0251% and 0.0260% (Attachment A, Table 9). ABT, Inc. also calculated the limiting permissible concentration (PLC) for the material to be dredged. That concentration was calculated as 1% of the lower of the LC50 and IC50 values for the test sediment (Attachment A, Table 9). The highest projected concentration of 0.0260% does not exceed the limiting permissible concentration of 0.47%. The dredged material is, therefore, predicted not to be acutely toxic to water column organisms.

Impacts to the benthic community at the Alcatraz Disposal Site due to the disposal of sediments from San Francisco Drydock Berths 1 and 2 could also include direct burial, substrate alteration and possible chemical contaminant uptake from the dredged sediments. Ten day solid phase (SP) bioassays were completed by ABT, Inc. with an appropriately sensitive acute toxicity test species (Ampelisca abdita) for determining potential benthic impacts of dredged material disposal. These results are summarized in Attachment A, Table 7. The solid phase LPC was not exceeded at any of the sampling locations.

Disposal of the dredged material at SF-11 could have short-term, adverse impacts on fishes and fish habitat. These impacts could be localized and increase turbidity due to additional TSS in the water column, and decrease DO levels. Water column impacts due to dredged material disposal events at SF-11 are generally temporary and conditions usually return within minutes to hours following disposal. Therefore, these impacts are considered to be minor.

The Corps has concerns regarding potential impacts to Pacific herring during its annual spawning season. The proposed maintenance dredging will occur within the traditional Pacific herring spawning

grounds. As a result, the Corps will condition the permit (if issued) so that dredging will not be allowed during the peak of the spawning season.

b. IMPACTS ON RESOURCES OUTSIDE THE AQUATIC ECOSYSTEM

(1) PHYSICAL CHARACTERISTICS AND ANTICIPATED CHANGES

Air Quality - Project activity would have minor, short-term impacts on air quality in the vicinity of the project site. Based on the relative minor size of the proposed project and limited to an evaluation of air quality impacts only within Corps of Engineers' (Corps) jurisdictional areas, the Corps has determined that the total direct and non-direct project emissions would not exceed the de minimis threshold levels of 40 CFR 93.153. Therefore, the proposed project would conform to the State Air Quality Implementation Plan (SIP) for California.

Noise Conditions - Short-term, adverse impacts on noise conditions in the local area could be expected from the operation of dredging equipment, with an expected increase in ambient noise levels.

(2) SOCIOECONOMIC CHARACTERISTICS AND ANTICIPATED CHANGES

Aesthetic Quality - The maintenance dredging and disposal operations would have short-term, adverse impacts on visual resources in the Bay. However, since dredging equipment and barges are frequently seen vessels on San Francisco and San Pablo Bays, the impact would likely be minor. The disposal of dredged material at SF-11, and the resultant turbidity plume following each disposal event would have short-term, adverse impacts on the visual resources in the area. However, turbidity plumes associated with disposal events generally last only minutes to hours. Therefore, this impact is considered to be minimal.

Economics - Long-term, beneficial impacts to San Francisco Drydock, Inc., as well as the City and County of San Francisco, are likely to result if the Drydock maintains its berthing areas.

Recreational Opportunities - Disposal of dredged material at SF-11 could have short-term, adverse impacts on recreational use of the area for boating and other activities. However, any such conflicts during disposal events are likely to be minor.

Recreational Fishing - See Recreational Opportunities.

(3) HISTORIC - CULTURAL CHARACTERISTICS AND ANTICIPATED CHANGES

Given the Drydock berthing areas have been previously dredged to depths equal to those requested in the subject permit application, it is unlikely any historic properties are present at the proposed dredging site. However, if any archaeological resources were encountered during the dredging operations, the Corps of Engineers would consult with the State Historic Preservation Officer pursuant to Section 106 of the National Historic Preservation Act and take into account any project effects on such properties.

c. SUMMARY OF INDIRECT IMPACTS

None have been identified.

d. SUMMARY OF CUMULATIVE IMPACTS

The maintenance dredging of the San Francisco Drydock berthing areas and the disposal of dredged material at the Alcatraz Disposal Site would cumulatively contribute to the resuspension of sediments in the San Francisco Bay system. The contribution of 266,000 cubic yards of sediment to this process probably represents a moderate, adverse impact.

e. CONCLUSIONS AND RECOMMENDATIONS

Based on an analysis of the above identified impacts, a preliminary determination has been made that it will not be necessary to prepare an

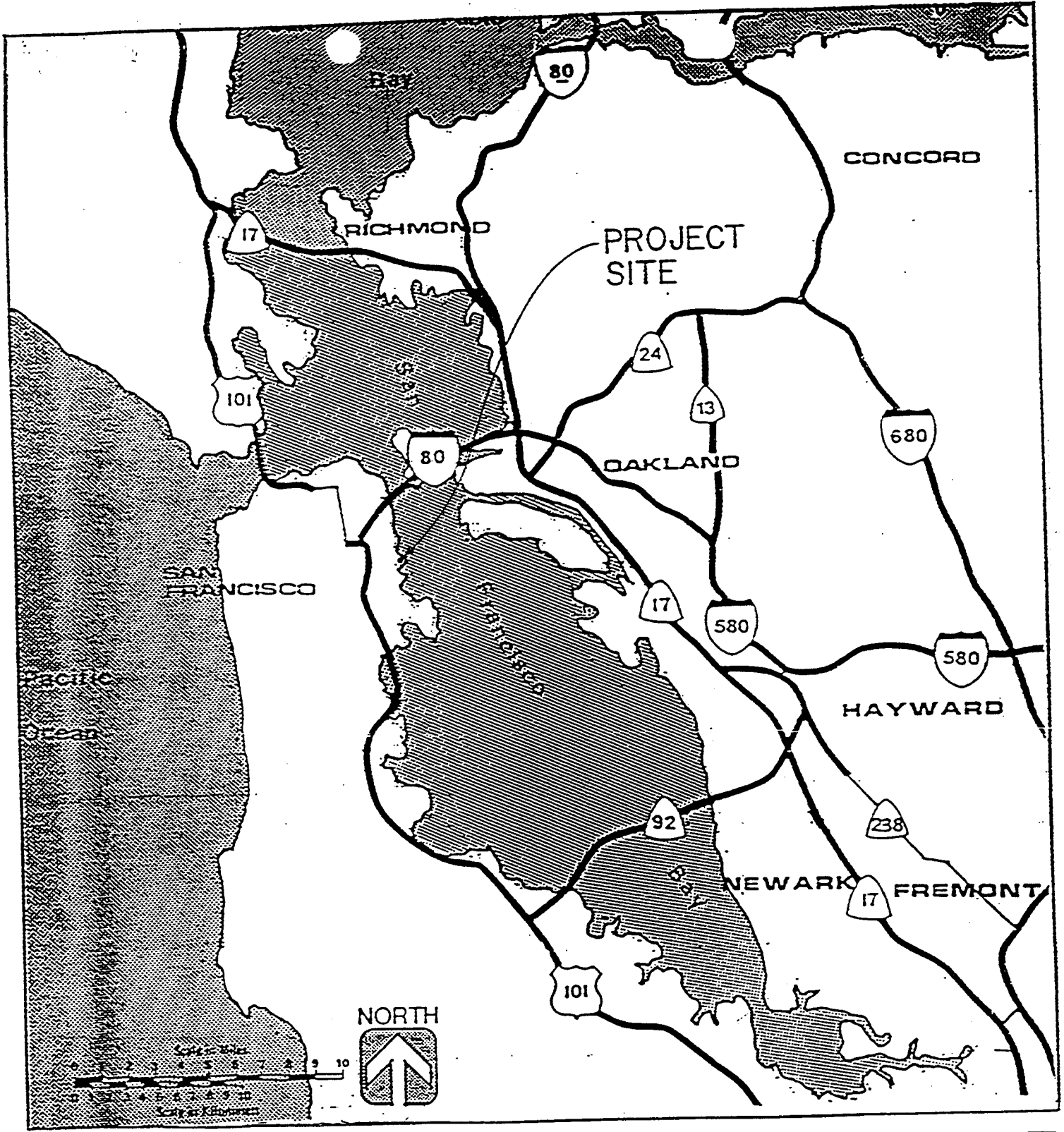
Environmental Impact Statement (EIS) for subject permit application. The Environmental Assessment for the proposed action, however, has not yet been finalized and this preliminary determination may be reconsidered if additional information is developed.

5. **EVALUATION OF ALTERNATIVES**: Evaluation of this activity's impact on the public interest will also include application of the guidelines promulgated by the Administrator of the Environmental Protection Agency under Section 404(b) of the Clean Water Act (33 U.S.C. 1344(b)).

6. **PUBLIC INTEREST EVALUATION:** The decision whether to issue a permit will be based on an evaluation of the probable impacts, including cumulative impacts, of the proposed activity and its intended use on the public interest. Evaluation of the probable impacts which the proposed activity may have on the public interest requires a careful weighing of all those factors which become relevant in each particular case. The benefits which reasonably may be expected to accrue from the proposal must be balanced against its reasonably foreseeable detriments. The decision whether to authorize a proposal, and if so the conditions under which it will be allowed to occur, are therefore determined by the outcome of the general balancing process. That decision will reflect the national concern for both protection and utilization of important resources. All factors which may be relevant to the proposal must be considered including the cumulative effects thereof. Among those are conservation, economics, aesthetics, general environmental concerns, wetlands, cultural values, fish and wildlife values, flood hazards, floodplain values, land use, navigation, shore erosion and accretion, recreation, water supply and conservation, water quality, energy needs, safety, food and fiber production, mineral needs, considerations of property ownership, and, in general, the needs and welfare of the people.

7. **CONSIDERATION OF COMMENTS:** The Corps of Engineers is soliciting comments from the public, Federal, State and local agencies and officials, Indian Tribes, and other interested parties in order to consider and evaluate the impacts of this proposed activity. Any comments received will be considered by the Corps of Engineers to determine whether to issue, modify, condition or deny a permit for this proposal. To make this decision, comments are used to assess impacts on endangered species, historic properties, water quality, general environmental effects, and the other public interest factors listed above. Comments are used in the preparation of an Environmental Assessment and/or an Environmental Impact Statement pursuant to the National Environmental Policy Act. Comments are also used to determine the need for a public hearing and to determine the overall public interest of the proposed activity.

8. **SUBMISSION OF COMMENTS:** Interested parties may submit in writing any comments concerning this activity. Comments should include the applicant's name, the number, and the date of this notice and should be forwarded so as to reach this office within the comment period specified on page one of this notice. Comments should be sent to: Lieutenant Colonel Richard G. Thompson, District Engineer, Attention: Regulatory Branch. It is Corps policy to forward any such comments which include objections to the applicant for resolution or rebuttal. Any person may also request, in writing, within the comment period of this notice that a public hearing be held to consider this application. Requests for public hearings shall state, with particularity, the reasons for holding a public hearing. Additional details may be obtained by contacting the applicant whose address is indicated in the first paragraph of this notice, or by contacting Mr. Rob Lawrence of our office at telephone (415) 977-8447 or by e-mail at rlawrence@smtp.spd.usace.army.mil. Details on any changes of a minor nature which are made in the final permit action will be provided on request.



PURPOSE: MAINTENANCE DREDGING TO PROVIDE SAFE NAVIGATIONAL WATERS FOR VESSELS

DATUM: MLLW
ADJACENT PROPERTY OWNERS

PORT OF SAN FRANCISCO

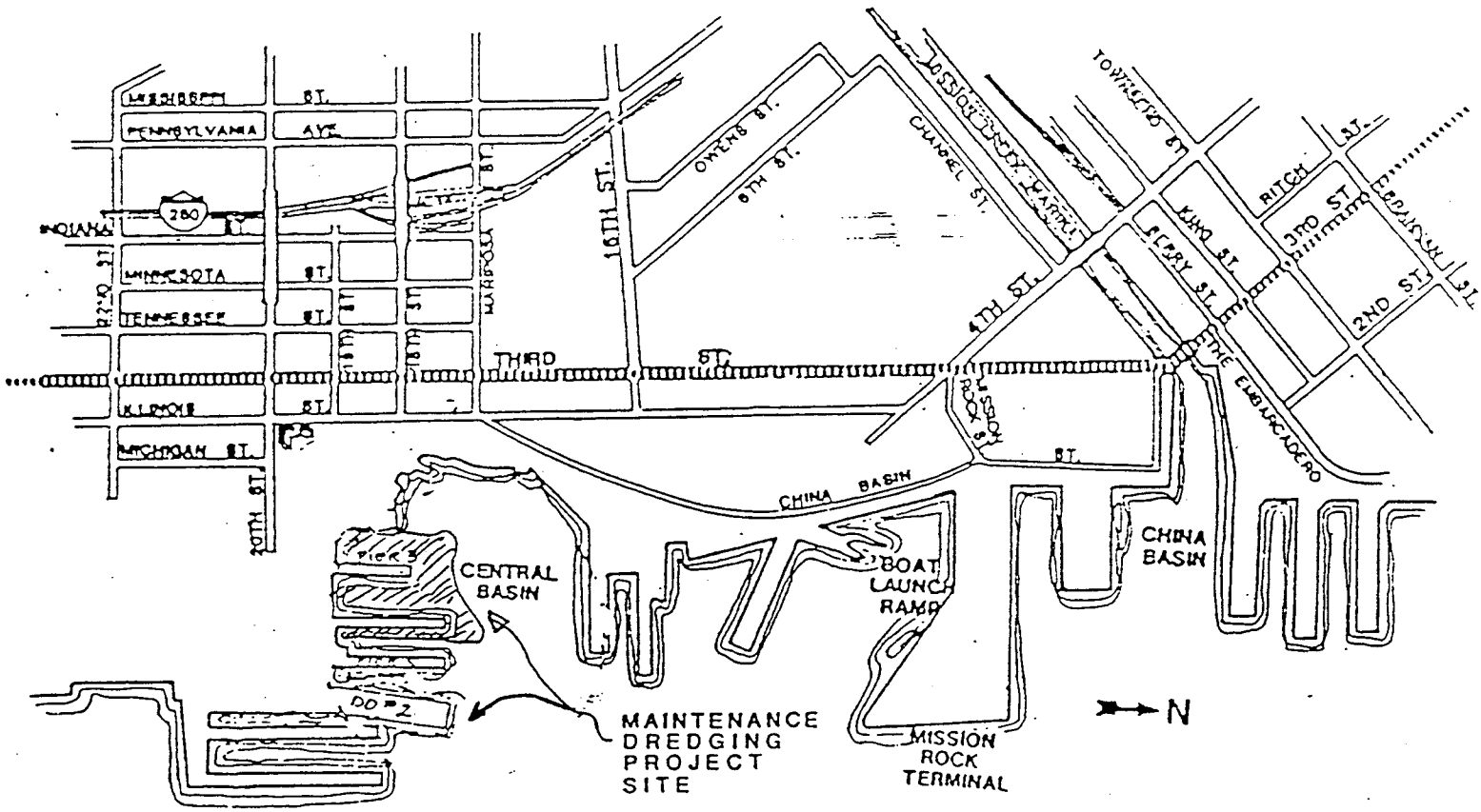
BAY AREA LOCATION

Date: 12/21/95 Sheet 1 of

PROPOSED - DREDGING NEXT TO PIERS

IN: SAN FRANCISCO BAY
AT: SANFRANCISCO DRYDOCK INC.
COUNTY OF: SAN FRAN.
STATE: CALIFORNIA

CITY OF SAN FRANCISCO



SAN FRANCISCO BAY

PURPOSE: MAINTENANCE DREDGING TO PROVIDE SAFE NAVIGATIONAL WATERS FOR VESSELS

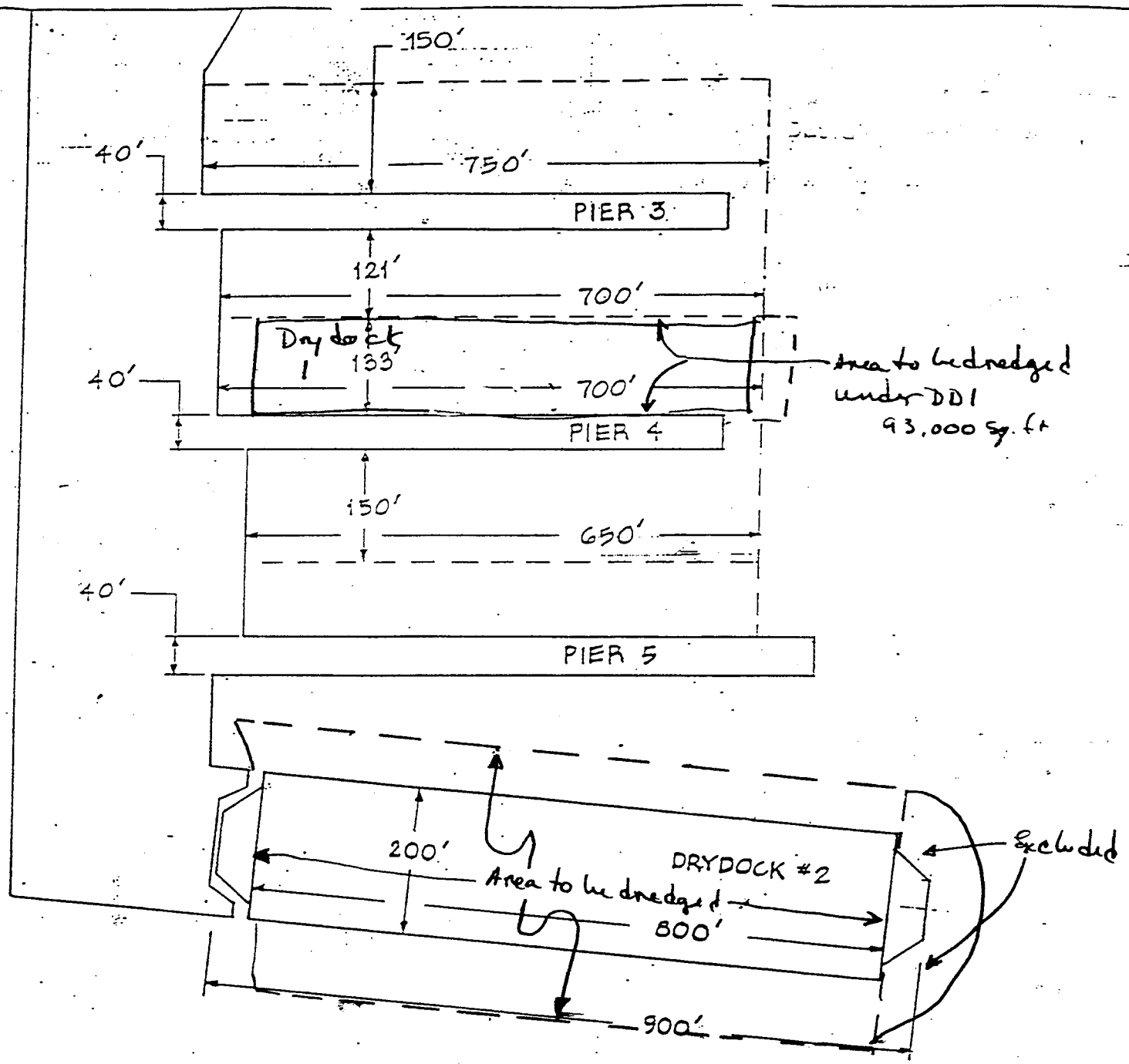
DATUM: MLLW
ADJACENT PROPERTY OWNERS

PORT OF SAN FRANCISCO

VICINITY MAP

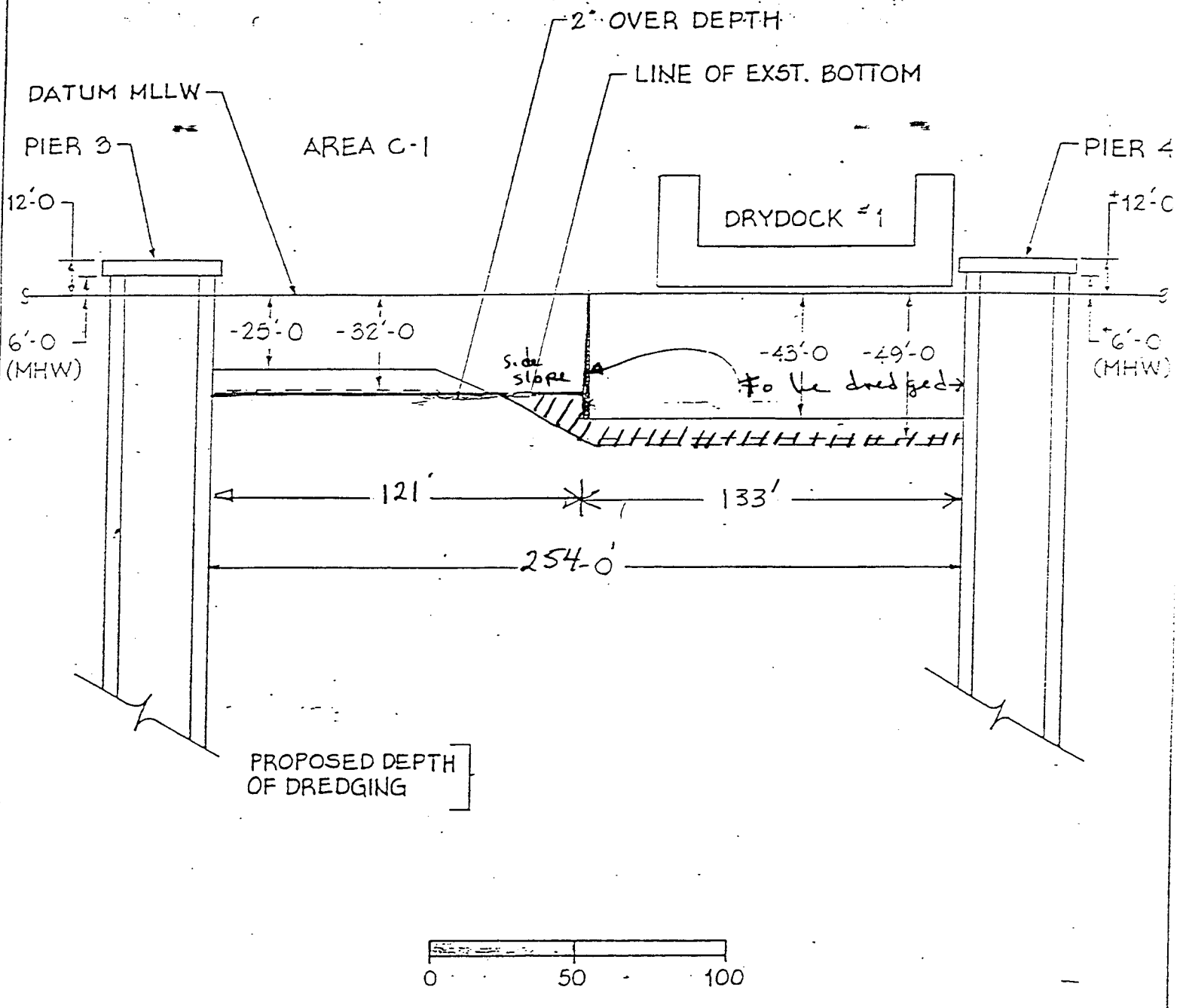
PROPOSED - DREDGING NEXT TO PIERS

IN: SAN FRANCISCO BAY
AT: SANFRANCISCO DRYDOCK INC.
COUNTY OF: SAN FRAN.
STATE: CALIFORNIA

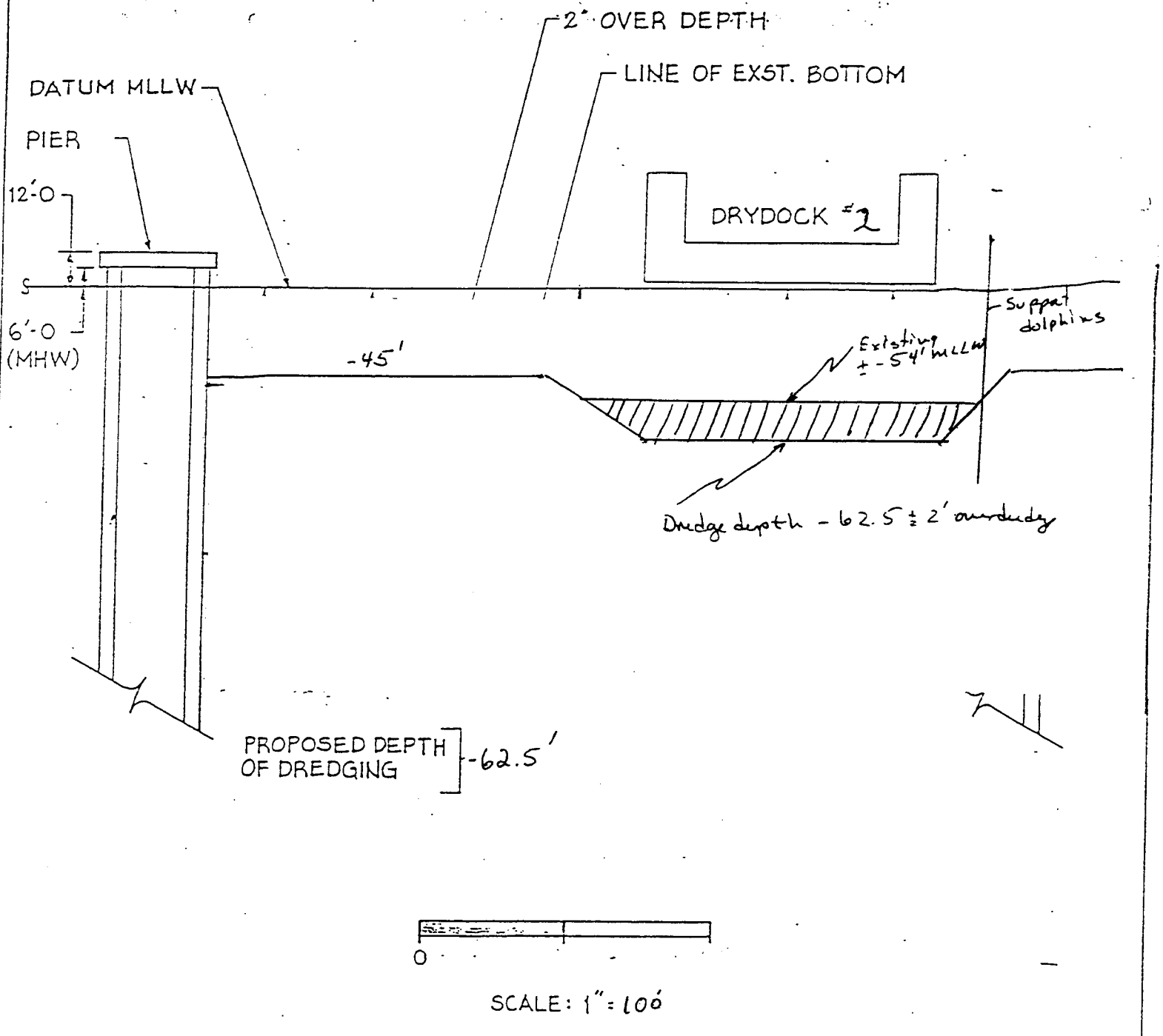


* 2'-0 ALLOWABLE OVER DEPTH IN EACH OF THE ABOVE AREA'S.

Purpose: Maintenance dredging to provide safe Navigational waters Datum: MLLW Adjacent Property Owners Port of San Francisco	PROJECT SITE Drydocks 1 and 2	Proposed - Dredging next to piers IN: San Francisco Bay AT: San Francisco Drydock Inc. County of: San Francisco



Purpose: Maintenance dredging to provide safe Navigational waters Datum: MLLW Adjacent Property Owners Port of San Francisco	**SECTION VIEW** Area C1.	Proposed - Dredging next to piers. IN: San Francisco Bay AT: San Francisco Drydock Inc. County of: San Francisco



Purpose: Maintenance dredging to provide safe Navigational waters Datum: MLLW Adjacent Property Owners Port of San Francisco	**SECTION VIEW** Typical Cross-Section Dry Dock 2 Date: 12/21/9 Sheet 5 of 5	Proposed - Dredging next to piers. IN: San Francisco Bay AT: San Francisco Drydock Inc. County of: San Francisco State: California

TABLE 2

SUMMARY OF SEDIMENT CHARACTERIZATION
San Francisco Drydock

Analyte (1)	Site	1	2	3	4	5A	5B	6	7	8	Alcatraz Reference	Detection Achvd	Limit Reqd (2)
Grain size (%)													
Gravel		0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	2.0		
Sand		1.1	0.8	1.0	1.7	2.4	2.0	4.4	2.9	2.2	96.1		
Silt		36.9	36.5	37.9	36.6	38.8	35.1	42.4	44.9	33.6	0.6		
Clay		61.9	62.6	61.1	61.7	58.8	62.9	53.2	52.1	64.2	1.3		
Solids (%) (Dry Wt.)		41.5	40.5	39.5	42.9	40.1	40.3	42.8	45.1	38.3	81.5		0.1
Sulfides (mg/kg)													
Total		176	163	63	18.9	12.5	24.3	24.3	102	7.3	ND	0.1	0.5
Water Soluble		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.1	0.1
Total Organic Carbon (%)		0.96	0.99	0.93	0.93	0.88	1.12	1.04	0.87	0.88	0.08		0.1
TRPH (mg/kg)		5	2	ND	ND	ND	7	5	ND	3	ND	1.0	0.1
Organotins (ug/kg)													
Tributyltin		ND	4.2	ND	4.7	6.0	4.5	2.3	ND	7.3	ND	1.0	1.0
Dibutyltin		14.5	2.7	ND	23.3	ND	ND	ND	11.5	4.2	ND	1.0	1.0
Monobutyltin		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.0	1.0
Tetrabutyltin		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.0	1.0
Metals (mg/kg)													
Arsenic (As)		1.4	ND	ND	ND	ND	ND	ND	ND	ND	3.7	0.1	0.1
Cadmium (Cd)		0.29	0.27	0.30	0.33	0.30	0.32	0.35	0.44	0.39	ND	0.1	0.1
Chromium (Cr)		90	96	99	94	93	110	93	100	99	25		0.1
Copper (Cu)		70	65	60	56	57	64	92	53	71	3.7		0.1
Lead (Pb)		32	34	34	29	29	29	32	24	33	8.3		0.1
Mercury (Hg)		0.26	0.17	0.61	0.28	ND	ND	ND	0.31	0.26	0.02	0.02	0.02
Nickel (Ni)		61	68	77	69	70	85	69	88	71	19		0.1
Selenium (Se)		ND	ND	ND	ND	ND	ND	0.44	ND	ND	ND	0.1	0.1
Silver (Ag)		ND	0.34	0.30	0.30	0.27	ND	0.33	ND	0.44	ND	0.1	0.1
Zinc (Zn)		110	120	110	100	110	120	110	110	110	19		0.1
Pesticides and PCBs (ug/kg)													
Aldrin		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2.0	2.0
Alpha-BHC		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2.0	2.0
Beta BHC		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2.0	2.0
Delta-BHC		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2.0	2.0
Chlordane		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	20.0	20.0
4,4' - DDD		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2.0	2.0
4,4' - DDE		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2.0	2.0
4,4' - DDT		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2.0	2.0
Dieldrin		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2.0	2.0
Endosulfan I		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2.0	2.0
Endosulfan II		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2.0	2.0
Endosulfan Sulfate		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2.0	2.0
Endrin		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2.0	2.0
Endrin Aldehyde		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2.0	2.0
Heptachlor		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2.0	2.0
Heptachlor Epoxide		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2.0	2.0
Methoxychlor		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2.0	2.0
Toxaphene		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	25.0	25.0
PCB Arochlor 1016		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	20.0	20.0
PCB Arochlor 1221		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	20.0	20.0
PCB Arochlor 1232		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	20.0	20.0
PCB Arochlor 1242		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	20.0	20.0
PCB Arochlor 1248		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	20.0	20.0
PCB Arochlor 1254		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	20.0	20.0
PCB Arochlor 1260		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	20.0	20.0

(1) All chemical analyses are given as dry weight basis.
(2) Detection limits required by USACOE.

TABLE 2 (Cont'd)

SUMMARY OF SEDIMENT CHARACTERIZATION
San Francisco Drydock

Analyte (1)	Site	1	2	3	4	5A	5B	6	7	8	Alcatraz Reference	Detection Limit Achvd	Detection Limit Reqd (2)
PAHs (µg/kg)													
Naphthalene		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	20	20
Acenaphthene		ND	ND	ND	ND	ND	ND	96	49	ND	ND	20	20
Acenaphthylene		ND	ND	ND	ND	ND	ND	86	115	ND	ND	20	20
Fluorene		58	ND	ND	51	ND	ND	91	53	60	ND	20	20
Phenanthrene		166	138	116	177	147	141	713	326	172	ND	20	20
Anthracene		169	138	119	135	110	149	402	164	110	ND	20	20
Fluoranthene		684	640	446	462	344	397	1,000	417	330	ND	20	20
Pyrene		1,060	1,060	800	709	596	600	2,170	761	705	ND	20	20
Benzo (A) Anthracene		400	402	309	284	209	367	769	248	219	ND	20	20
Chrysene		549	556	425	361	262	511	752	231	266	ND	20	20
Benzo (B) Fluoranthene		359	353	289	228	162	380	477	111	198	ND	20	20
Benzo (K) Fluoranthene		354	341	271	235	167	355	549	151	206	ND	20	20
Benzo (A) Pyrene		422	393	324	275	207	400	759	191	251	ND	20	20
Dibenzo (A,H) Anthracene		60	57	ND	ND	ND	60	117	ND	ND	ND	20	20
Ideno (1,2,3-CD) Pyrene		308	274	215	184	137	241	430	102	185	ND	20	20
Benzo (G,H,I) Perylene		325	279	218	191	142	233	465	102	201	ND	20	20
Total		4,914	4,631	3,532	3,292	2,483	3,834	8,876	3,021	2,903	0		
Phthalate Esters (µg/kg)													
Bis (2-ethylhexyl) Phthalate		234	217	185	212	257	228	206	153	410	45	50	20
Butylbenzyl Phthalate		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	8.5	20
Di-n-butyl Phthalate		128	141	180	219	284	241	159	294	196	87	9	20
Diethyl Phthalate		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	12	20
Dimethyl Phthalate		ND	32	ND	26	42	30	28	27	34	ND	7.3	20
Di-n-octyl Phthalate		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	75	20
Total		362	390	365	448	583	499	393	384	640	132		
Initial Ammonia		1.68	1.44	1.76	1.80	1.76	1.44	0.88	1.12	1.52	1.92		
Final Ammonia		2.76	1.68	0.60	0.84	0.20	0.60	0.24	0.12	0.32	0.04		

(1) All chemical analyses are given as dry weight basis.
(2) Detection limits required by USACOE.

TABLE 4

Mytilus edulis

SUMMARY OF RESULTS FOR THE ELUTRIATE TEST

San Francisco Drydock

Concentration (%)	Total Larvae/mL	% Survival	LC50 (%)	% Abnormal	IC50 (%)
Control	27.3	98.2		3.3	
Alcatraz Reference					
1	24.9	89.6	>100	5.8	>100
10	23.9	86.0		6.5	
50	25.7	92.4		5.6	
100	24.2	87.1		13.8	
Site DD-1					
1	24.7	88.8	69.5	3.2	74
10	26.3	94.6		4.4	
50	23.0	82.7		9.0	
100	0.2	0.7		94.4	
Site DD-2					
1	25.1	90.3	92	3.5	>100
10	25.5	91.7		4.0	
50	26.8	96.4		2.4	
100	11.6	41.7		40.9	
Site DD-3					
1	21.6	77.7	60	3.9	74
10	23.2	83.5		3.3	
50	20.9	75.2		7.3	
100	0.1	0.4		95.6	
Site DD-4					
1	25.3	91.0	47	5.0	80
10	20.3	73.0		12.5	
50	13.5	48.6		13.7	
100	1.9	6.8		73.2	
Site DD-5A					
1	25.5	91.7	55	5.5	73
10	20.7	74.5		4.0	
50	20.0	71.9		11.7	
100	0.3	1.1		93.4	

TABLE 4 (Cont'd)

Mytilus edulis

SUMMARY OF RESULTS FOR THE ELUTRIATE TEST

San Francisco Drydock

Concentration (%)	Total Larvae/mL	% Survival	LC50 (%)	% Abnormal	IC50 (%)
Site DD-5B					
1	23.9	86.0	73	7.7	72
10	25.1	90.3		4.6	
50	24.3	87.4		6.4	
100	1.3	4.7		80.3	
Site DD-6					
1	25.2	90.6	>100	4.3	>100
10	22.3	80.2		3.8	
50	24.8	89.2		10.1	
100	24.4	87.8		17.1	
Site DD-7					
1	21.3	76.6	78	5.6	61
10	25.1	90.3		9.9	
50	23.3	83.8		35.5	
100	5.6	20.1		100.0	
Site DD-8					
1	22.6	81.3	66	4.0	72
10	20.9	75.2		3.9	
50	20.5	73.7		11.5	
100	0.5	1.8		96.6	

TABLE 7

Ampelisca abdita
SUMMARY OF THE AMPHIPOD BIOASSAY
San Francisco Drydock

Site	Rep	Initial Added	Total Number Surviving	% Survival
Control	1	20	19	95.0
	2	20	20	100.0
	3	20	18	90.0
	4	20	20	100.0
	5	20	19	95.0
				96.0
Alcatraz Reference	1	20	18	90.0
	2	20	20	100.0
	3	20	20	100.0
	4	20	20	100.0
	5	20	18	90.0
				96.0
Site DD-1	1	20	17	85.0
	2	20	19	95.0
	3	20	16	80.0
	4	20	18	90.0
	5	20	19	95.0
				89.0
Site DD-2	1	20	17	85.0
	2	20	18	90.0
	3	20	18	90.0
	4	20	17	85.0
	5	20	20	100.0
				90.0
Site DD-3	1	20	19	95.0
	2	20	20	100.0
	3	20	19	95.0
	4	20	18	90.0
	5	20	20	100.0
				96.0
Site DD-4	1	20	20	100.0
	2	20	18	90.0
	3	20	20	100.0
	4	20	18	90.0
	5	20	20	100.0
				96.0

* Statistically significant from the Reference.

TABLE 7 (Cont'd)

Ampelisca abdita
SUMMARY OF THE AMPHIPOD BIOASSAY
San Francisco Drydock

Site	Rep	Initial Added	Total Number Surviving	% Survival
Site DD-5A	1	20	19	95.0
	2	20	20	100.0
	3	20	20	100.0
	4	20	19	95.0
	5	20	19	95.0
				97.0
Site DD-5B	1	20	20	100.0
	2	20	17	85.0
	3	20	20	100.0
	4	20	20	100.0
	5	20	19	95.0
				96.0
Site DD-6	1	20	17	85.0
	2	20	20	100.0
	3	20	20	100.0
	4	20	19	95.0
	5	20	20	100.0
				96.0
Site DD-7	1	20	19	95.0
	2	20	20	100.0
	3	20	20	100.0
	4	20	18	90.0
	5	20	16	80.0
				93.0
Site DD-8	1	20	20	100.0
	2	20	20	100.0
	3	20	20	100.0
	4	20	19	95.0
	5	20	19	95.0
				98.0

* Statistically significant from the Reference.

TABLE 9

CALCULATION OF THE LIMITING PERMISSIBLE CONCENTRATION

Project Site: San Francisco Drydock

Species: *Mytilus edulis* **Disposal Site:** Alcatraz

Mixing Zone Estimation	Site 1	Site 2	Site 3	Site 4	Site 5A	Site 5B
Depth of disposal site (m)=	15	15	15	15	15	15
Pi=	3.14159	3.14159	3.14159	3.14159	3.14159	3.14159
Width of vessel (m)=	10	10	10	10	10	10
Length of vessel (m)=	30	30	30	30	30	30
Speed of vessel (m/sec)=	0.5	0.5	0.5	0.5	0.5	0.5
Time of discharge (sec)=	30	30	30	30	30	30
Depth of vessel (m)=	3	3	3	3	3	3
Mixing Zone Volume (cu.m)=	642989	642989	642989	642989	642989	642989
Volume of Liquid Phase						
Bulk density (constant) =	1.3	1.3	1.3	1.3	1.3	1.3
Particle density (constant) =	2.6	2.6	2.6	2.6	2.6	2.6
Density of liquid phase (constant) =	1	1	1	1	1	1
Vol. of disposal vessel (cu.m)=	900	900	900	900	900	900
Liquid phase volume (cu.m)=	731	731	731	731	731	731
Concentration of suspended phase						
Percent Silt=	36.9	36.5	37.9	36.6	38.8	35.1
Percent Clay=	61.9	62.6	61.1	61.7	58.8	62.9
Volume of Suspended Phase (cu.m)=	167	167	167	166	165	165
Projected Concentration (percent SP) =	0.0259	0.0260	0.0260	0.0258	0.0256	0.0257
Lowest LC50 or EC50 from L/SP bioassay=	69.5	92	60	47	55	72
Factored LC50 or EC50 (0.01)	0.695	0.92	0.6	0.47	0.55	0.72

The factored LC50 or EC50 is higher than the projected concentration; therefore the Limiting Permissible Concentration is not exceeded for this dredge material for the Alcatraz Disposal site.

Site 1	**TRUE**
Site 2	**TRUE**
Site 3	**TRUE**
Site 4	**TRUE**
Site 5A	**TRUE**
#VALUE!	**TRUE**

TABLE 9 (Cont'd)

CALCULATION OF THE LIMITING PERMISSIBLE CONCENTRATION

Project Site: San Francisco Drydock

Species: *Mytilus edulis* **Disposal Site:** Alcatraz

Mixing Zone Estimation	Site 6	Site 7	Site 8
Depth of disposal site (m)=	15	15	15
Pi=	3.14159	3.14159	3.14159
Width of vessel (m)=	10	10	10
Length of vessel (m)=	30	30	30
Speed of vessel (m/sec)=	0.5	0.5	0.5
Time of discharge (sec)=	30	30	30
Depth of vessel (m)=	3	3	3
Mixing Zone Volume (cu.m)=	642989	642989	642989
Volume of Liquid Phase			
Bulk density (constant) =	1.3	1.3	1.3
Particle density (constant) =	2.6	2.6	2.6
Density of liquid phase (constant) =	1	1	1
Vol. of disposal vessel (cu.m)=	900	900	900
Liquid phase volume (cu.m)=	731	731	731
Concentration of suspended phase			
Percent Silt=	42.4	44.9	33.6
Percent Clay=	53.2	52.1	64.2
Volume of Suspended Phase (cu.m)=	161	164	165
Projected Concentration (percent SP) =	0.0251	0.0255	0.0257
Lowest LC50 or EC50 from L/SP bioassay=	100	61	66
Factored LC50 or EC50 (0.01)	1	0.61	0.66

The factored LC50 or EC50 is higher than the projected concentration; therefore the Limiting Permissible Concentration is not exceeded for this dredge material for the Alcatraz Disposal site.

Site 6	**TRUE**
Site 7	**TRUE**
Site 8	**TRUE**